Presentationalcomponents

Presentational Overview ■ Presentational components are the atomic components in the PlayPlus architecture that focus purely on rendering and user interaction. They receive data through inputs and emit events through outputs, making them highly reusable and testable. Key Characteristics ■ Pure Components ■ Focus solely on presentation and user interaction No business logic or data fetching Receive all data through inputs Emit events through outputs Unidirectional Data Flow ■ Data flows in through inputs Events flow out through outputs No direct service dependencies Predictable and testable behavior Accessibility First ■ Built-in ARIA support Keyboard navigation Screen reader friendly Semantic HTML structure Template Structure ■ TypeScript Component (component.ts.hbs) ■ import { Component , ChangeDetectionStrategy , input , output , computed , } from "@angular/core" ; import { CommonModule } from "@angular/common" ; export interface ExampleData { readonly id : string ; readonly title : string ; readonly description ? : string ; readonly isActive : boolean ; } @ Component ({ selector : "app-example" , standalone : true , imports : [CommonModule] , templateUrl : "./example.component.html" , styleUrls : ["./example.component.scss"] , changeDetection : ChangeDetectionStrategy . OnPush , }) export class ExampleComponent { // Signal inputs (Angular 17+) readonly data = input . required < ExampleData > ( ) ; readonly customStyles = input < Record < string , string >> ({ }) ; readonly disabled = input < boolean > (false) ; // Signal outputs (Angular 17+) readonly actionTriggered = output < string > ( ) ; readonly itemClicked = output < ExampleData > ( ) ; // Computed values readonly isInteractive = computed (( ) => ! this . disabled ( ) && this . data ( ) . isActive) ; readonly safeStyles = computed (( ) => this . sanitizeStyles (this . customStyles ( ))) ; readonly ariaLabel = computed (( ) => ` ${ this . data ( ) . title } - ${ this . data ( ) . description || "No description" } `) ; protected onAction ( ) : void { if (this . isInteractive ( )) { this . actionTriggered . emit (this . data ( ) . id) ; } } protected onClick ( ) : void { if (this . isInteractive ( )) { this . itemClicked . emit (this . data ( )) ; } } protected onKeyDown (event : KeyboardEvent) : void { if (event . key === "Enter" || event . key === " ") { event . preventDefault ( ) ; this . onClick ( ) ; } } private sanitizeStyles (styles : Record < string , string >) : Record < string , string > { // Implement style validation logic const allowedProperties = ["color" , "background-color" , "border" , "padding" , "margin" ,] ; return Object . entries (styles) . reduce ((acc , [key , value]) => { if (allowedProperties . includes (key)) { acc [key] = value ; } return acc ; } , { } as Record < string , string >) ; } } HTML Template (component.html.hbs) ■ < article class = " example-component " [class.disabled]

= " disabled() " [class.interactive] = " isInteractive() " [attr.aria-label] = " ariaLabel() " [attr.aria-disabled] = " disabled() " role = " article " tabindex = " 0 " (click) = " onClick() " (keydown) = " onKeyDown($event) " [style] = " safeStyles() | json " > < header class = " component-header " > < h3 class = " component-title " > </ h3 > @if (data.description) { < p class = " component-description " > </ p > } </ header > < div class = " component-content " > <!-- Component content goes here --> < div class = " content-placeholder " > < p > Component content goes here </ p > </ div > </ div > < footer class = " component-footer " > @if (isInteractive()) { < button type = " button " class = " action-button " (click) = " onAction(); $event.stopPropagation() " (keydown.enter) = " onAction(); $event.stopPropagation() " (keydown.space) = " onAction(); $event.stopPropagation() " aria-label = " " > Action </ button > } </ footer > </ article > Features ■ Built-in Features ■ Signal Inputs/Outputs Modern Angular 17+ signal-based inputs Type-safe data flow Reactive updates Accessibility ARIA labels and roles Keyboard navigation support Screen reader friendly Semantic HTML structure Style Customization Custom styles input Style sanitization for security CSS custom properties support Interaction States Disabled state handling Interactive state computation Event handling with proper validation Best Practices ■ Input Validation readonly data = input . required < ExampleData > ( ) ; readonly disabled = input < boolean > (false) ; Computed Values readonly isInteractive = computed (( ) => ! this . disabled ( ) && this . data ( ) . isActive) ; Event Handling protected onClick ( ) : void { if (this . isInteractive ( )) { this . itemClicked . emit (this . data ( )) ; } } Accessibility readonly ariaLabel = computed (( ) => ` ${ this . data ( ) . title } - ${ this . data ( ) . description || 'No description' } `) ; Basic Presentational Component ■ # Generate a presentational component playplus generate presentational user-card This creates: UserCardComponent with data input Action and click outputs Accessibility features Storybook stories Advanced Presentational Component ■ # Generate with custom interface playplus generate presentational product-tile --interface=Product This creates: ProductTileComponent with Product interface Custom styling support Comprehensive interaction handling Integration with Container Components ■ Presentational components are used by container components: // In container component template < app - user - card [data] = "userData()" [disabled] = "loading()" (actionTriggered) = "onUserAction($event)" (itemClicked) = "onUserSelect($event)" > < / app - user - card > // In container component class export class UserListContainerComponent { protected users = signal < User [ ] > ([ ]) ; protected userData = computed (( ) => this . users ( ) . map ((user) => ({ id : user . id , title : user . name , description : user . email , isActive : user . isActive , }))) ; protected onUserAction (userId : string) : void { // Handle user action } protected onUserSelect (user : User) : void { // Handle user selection } } Data Interface

Pattern ■ Each presentational component defines its own data interface: export interface UserCardData { readonly id : string ; readonly title : string ; readonly description ? : string ; readonly isActive : boolean ; readonly avatar ? : string ; readonly role ? : string ; } This ensures: Type safety Clear contract between components Easy refactoring Better IDE support Styling and Theming ■ CSS Custom Properties ■ .example-component { --card-background: #ffffff; --border-color: #e0e0e0; --text-color: #333333; --interactive-color: #007bff; background: var(--card-background); border: 1px solid var(--border-color); color: var(--text-color); } .example-component.interactive:hover { border-color: var(--interactive-color); } Custom Styles Input ■ // In container component < app - user - card [data] = "userData()" [customStyles] = " { '--card-background' : '#f8f9fa' , '--border-color' : '#007bff' } " > < / app - user - card > Testing ■ Presentational components include comprehensive tests: describe ("UserCardComponent" , ( ) => { let component : UserCardComponent ; beforeEach (( ) => { component = new UserCardComponent ( ) ; }) ; it ("should emit action when clicked" , ( ) => { const spy = jasmine . createSpy ( ) ; component . actionTriggered . subscribe (spy) ; component . onAction ( ) ; expect (spy) . toHaveBeenCalledWith ("test-id") ; }) ; it ("should be interactive when not disabled and active" , ( ) => { component . data . set ({ id : "1" , title : "Test" , isActive : true , }) ; component . disabled . set (false) ; expect (component . isInteractive ( )) . toBe (true) ; }) ; }) ; Architecture Benefits ■ Reusability : Can be used across different containers Testability : Pure functions are easy to test Maintainability : Clear separation of concerns Performance : OnPush change detection Accessibility : Built-in a11y features Common Patterns ■ List Items ■ // User list item export interface UserListItemData { readonly id : string ; readonly title : string ; readonly subtitle ? : string ; readonly avatar ? : string ; readonly isActive : boolean ; readonly isSelected ? : boolean ; } Cards ■ // Product card export interface ProductCardData { readonly id : string ; readonly title : string ; readonly description ? : string ; readonly price : number ; readonly image ? : string ; readonly isAvailable : boolean ; readonly rating ? : number ; } Forms ■ // Form field export interface FormFieldData { readonly id : string ; readonly label : string ; readonly placeholder ? : string ; readonly value : string ; readonly type : "text" | "email" | "password" ; readonly required : boolean ; readonly error ? : string ; } Next Steps ■ After creating a presentational component: Define the data interface for your specific use case Customize the template with your content Add styling to match your design system Create stories for visual testing Write tests for all interaction scenarios Use in container components for data integration Developer Checklist ■ Before Creating Presentational Components: ■ Is the component purely presentational (no business logic)? Are all inputs typed with TypeScript interfaces? Are all user interactions handled through outputs? Is

OnPush change detection enabled? Are computed values used for derived state? Is disabled state properly handled? Are all interactive elements keyboard accessible? Do I have unit tests for all interaction scenarios? Is the component reusable across contexts? Are style customization options provided?

```
import {
  Component,
  ChangeDetectionStrategy,
  input,
  output,
  computed,
} from "@angular/core";
import { CommonModule } from "@angular/common";

export interface ExampleData {
  readonly id: string;
  readonly title: string;
  readonly description?: string;
  readonly isActive: boolean;
}

@Component({
  selector: "app-example",
  standalone: true,
  imports: [CommonModule],
  templateUrl: "./example.component.html",
  styleUrls: ["./example.component.scss"],
  changeDetection: ChangeDetectionStrategy.OnPush,
})
export class ExampleComponent {
  // Signal inputs (Angular 17+)
  readonly data = input.required<ExampleData>();
  readonly customStyles = input<Record<string, string>>({});
  readonly disabled = input<boolean>(false);

  // Signal outputs (Angular 17+)
  readonly actionTriggered = output<string>();
  readonly itemClicked = output<ExampleData>();

  // Computed values
  readonly isInteractive = computed(
    () => !this.disabled() && this.data().isActive
  );
  readonly safeStyles = computed(() =>
    this.sanitizeStyles(this.customStyles())
  );
  readonly ariaLabel = computed(
    () =>
      `${this.data().title} - ${this.data().description || "No description"}`
  );
```

```
  protected onAction(): void {
    if (this.isInteractive()) {
      this.actionTriggered.emit(this.data().id);
    }
  }

  protected onClick(): void {
    if (this.isInteractive()) {
      this.itemClicked.emit(this.data());
    }
  }

  protected onKeyDown(event: KeyboardEvent): void {
    if (event.key === "Enter" || event.key === " ") {
      event.preventDefault();
      this.onClick();
    }
  }

  private sanitizeStyles(
    styles: Record<string, string>
  ): Record<string, string> {
    // Implement style validation logic
    const allowedProperties = [
      "color",
      "background-color",
      "border",
      "padding",
      "margin",
    ];

    return Object.entries(styles).reduce((acc, [key, value]) => {
      if (allowedProperties.includes(key)) {
        acc[key] = value;
      }
      return acc;
    }, {} as Record<string, string>);
  }
}


---

<article
  class="example-component"
  [class.disabled]="disabled()"
  [class.interactive]="isInteractive()"
  [attr.aria-label]="ariaLabel()"
  [attr.aria-disabled]="disabled()"
  role="article"
  tabindex="0"
  (click)="onClick()"
  (keydown)="onKeyDown($event)"
```

```
  [style]="safeStyles() | json"
>
  <header class="component-header">
    <h3 class="component-title">{{ data.title }}</h3>
    @if (data.description) {
    <p class="component-description">{{ data.description }}</p>
    }
  </header>

  <div class="component-content">
    <!-- Component content goes here -->
    <div class="content-placeholder">
      <p>Component content goes here</p>
    </div>
  </div>

  <footer class="component-footer">
    @if (isInteractive()) {
    <button
      type="button"
      class="action-button"
      (click)="onAction(); $event.stopPropagation()"
      (keydown.enter)="onAction(); $event.stopPropagation()"
      (keydown.space)="onAction(); $event.stopPropagation()"
      aria-label="Trigger action for {{ data.title }}"
    >
      Action
    </button>
    }
  </footer>
</article>


---

readonly data = input.required<ExampleData>();
readonly disabled = input<boolean>(false);


---

readonly isInteractive = computed(() =>
  !this.disabled() && this.data().isActive
);


---

protected onClick(): void {
  if (this.isInteractive()) {
    this.itemClicked.emit(this.data());
  }
}
```

```
---

readonly ariaLabel = computed(() =>
  `${this.data().title} - ${this.data().description || 'No description'}`
);


---

# Generate a presentational component
playplus generate presentational user-card


---

# Generate with custom interface
playplus generate presentational product-tile --interface=Product


---

// In container component template
<app-user-card
  [data]="userData()"
  [disabled]="loading()"
  (actionTriggered)="onUserAction($event)"
  (itemClicked)="onUserSelect($event)">
</app-user-card>


---

// In container component class
export class UserListContainerComponent {
  protected users = signal<User[]>([]);

  protected userData = computed(() =>
    this.users().map((user) => ({
      id: user.id,
      title: user.name,
      description: user.email,
      isActive: user.isActive,
    }))
  );

  protected onUserAction(userId: string): void {
    // Handle user action
  }

  protected onUserSelect(user: User): void {
    // Handle user selection
  }
}
```

```
---

export interface UserCardData {
  readonly id: string;
  readonly title: string;
  readonly description?: string;
  readonly isActive: boolean;
  readonly avatar?: string;
  readonly role?: string;
}


---

.example-component {
  --card-background: #ffffff;
  --border-color: #e0e0e0;
  --text-color: #333333;
  --interactive-color: #007bff;

  background: var(--card-background);
  border: 1px solid var(--border-color);
  color: var(--text-color);
}

.example-component.interactive:hover {
  border-color: var(--interactive-color);
}


---

// In container component
<app-user-card
  [data]="userData()"
  [customStyles]="{
    '--card-background': '#f8f9fa',
    '--border-color': '#007bff'
  }">
</app-user-card>


---

describe("UserCardComponent", () => {
  let component: UserCardComponent;

  beforeEach(() => {
    component = new UserCardComponent();
  });

  it("should emit action when clicked", () => {
    const spy = jasmine.createSpy();
```

```
    component.actionTriggered.subscribe(spy);

    component.onAction();

    expect(spy).toHaveBeenCalledWith("test-id");
  });

  it("should be interactive when not disabled and active", () => {
    component.data.set({
      id: "1",
      title: "Test",
      isActive: true,
    });
    component.disabled.set(false);

    expect(component.isInteractive()).toBe(true);
  });
});


---

// User list item
export interface UserListItemData {
  readonly id: string;
  readonly title: string;
  readonly subtitle?: string;
  readonly avatar?: string;
  readonly isActive: boolean;
  readonly isSelected?: boolean;
}


---

// Product card
export interface ProductCardData {
  readonly id: string;
  readonly title: string;
  readonly description?: string;
  readonly price: number;
  readonly image?: string;
  readonly isAvailable: boolean;
  readonly rating?: number;
}


---

// Form field
export interface FormFieldData {
  readonly id: string;
  readonly label: string;
```

```
  readonly placeholder?: string;
  readonly value: string;
  readonly type: "text" | "email" | "password";
  readonly required: boolean;
  readonly error?: string;
}
```